

## ABSTRACT OF THE DISCLOSURE

A motor power supply for and a method of operating a poly-phase AC motor with power provided from an AC power source through a DC-conversion circuit and an inverter. An output voltage of the DC-conversion circuit is sensed and a controller controls an inrush current limiting resistance to be selectively bypassed according to a first value of the output voltage and controls a pair of switches in an overvoltage protection circuit to return energy stored in the DC-conversion circuit to the AC power source according to second and third values of the output voltage. An operation of the switches is synchronously controlled according to a phase of the AC power source. The overvoltage protection circuit eliminates an overvoltage in the DC-conversion circuit due to energy regenerated by the motor and passed through the inverter to the DC-conversion circuit.